Michele Camerota

COMMISSAR-SCIENCE: ARTHUR KOESTLER AND GALILEO

ESTRATTO

da

THE SCIENCE AND MYTH OF GALILEO
Between the Seventeenth and Nineteenth Centuries in Europe
Proceedings of the International Conference
(Firenze, Museo Galileo, 29-31 January 2020)

A cura di Massimo Bucciantini

Leo S. Olschki Editore
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GALILÆANA
Studies in Renaissance and Early Modern Science

Editors:

Massimo Bucciantini
Michele Camerota
Franco Giudice

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CONTENTS

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COMMISSAR-SCIENCE: ARTHUR KOESTLER AND GALILEO

The Galileo scandal marked a turning point – a hardening of the fronts, the polarisation of rigid orthodoxies. The point I have been trying to make is that the blame was not all on one side; that the presumption of the theologians was matched by the *hubris* of an unbalanced genius and the vindictiveness of a benighted academic coterie.[1]

With these words Arthur Koestler concluded an article written for «The Observer» in February 1964 to mark the four-hundredth anniversary of the birth of Galileo.

The application of the term «scandal» to the quarrel between Galileo and the Church was not new to Koestler. He had already devoted many controversial pages to it in his 1959 book *The Sleepwalkers*, the successful and compelling account of the history of conceptions of the universe from antiquity to Newton.[2] That work, which was written between 1955 and 1958,[3] was originally conceived as «a triangular biography of Kepler, Galileo and Bruno»,[4] but Koestler soon gave up the idea of studying the figure of Bruno – whom he defined in a nutshell as «the Bertrand Russell of his age»[5] – to concentrate on the triad of Copernicus, Kepler and Galileo. Roughly 80 per cent of the volume was devoted to them.

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1 Arthur Koestler, *The Greatest Scandal in Christendom*, «The Observer», 2 February 1964, pp. 21, 29: 29. Cf. also Id., *Drinkers of Infinity: Essays 1955-1967*, London, Hutchinson, 1968 (1970²), pp. 18-31: 31.

2 Arthur Koestler, *The Sleepwalkers. A History of Man's Changing Vision of the Universe*, London, Hutchinson, 1959 (repr. London, Arkana Penguin, 1989). Hereafter *SW*.

3 Cf. Cynthia Koestler, *Twenty-five Writing Years*, in Harold Harris (ed.), *Astride the Two Cultures. Arthur Koestler at 70*, London, Hutchinson, 1975, pp. 136-148: 138-139.

4 Arthur & Cynthia Koestler, *Stranger on the Square*, London, Hutchinson, 1984, p. 188.

5 Arthur Koestler, *The Trail of the Dinosaur*, London, Collins, 1955 (repr. London, Vintage, 1994), p. 155.

The main protagonist of *The Sleepwalkers* is indubitably Johannes Kepler, one of the heroes of Koestler's youth.[6] He identified with him and regarded the German astronomer as a «kindred spirit».[7] With his capacity to exploit the inventive potential of his own tormented obsessions,[8] Kepler was an eloquent example of the bisociative conception of creativity that Koestler had expounded in 1949 in his *Insight and Outlook*.[9]

In shifting the problem of the planetary orbits from a purely kinematic framework to that of the forces that produce the motion of the planets, the author of *Astronomia nova* had achieved a brilliant (bisociative) interpolation of physical causality within the geometric formalism of the heavens. In doing so, he projected the analysis of planetary dynamics onto a completely new level, and one that was to herald revolutionary new insights.[10]

But there is another, more fundamental and determinant bisociative aspect that, according to Koestler, characterises Kepler's scientific contribution: that of having combined mysticism and scientific investigation in his own research, intertwining in an original manner the «twin threads of Science and Religion»:[11]

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6 «The heroes of my youth were Darwin and Spencer, Kepler, Newton and Mach»; ARTHUR KOESTLER, *Arrow in the Blue*, London, Collins, 1952, p. 51.

7 In a page of his diary for 1955, Koestler noted down the self-defining formula «K = K». According to his wife Cynthia, he had discovered «a kindred spirit» in Kepler; KOESTLER, *Stranger on the Square* (cit. note 4), p. 189. Cf. DAVID CESARANI, *Arthur Koestler. The Homeless Mind*, New York, Free Press, 1998, p. 451; MICHAEL SCAMMELL, *Koestler. The Indispensable Intellectual*, London, Faber & Faber, 2010, pp. 460-461; and esp. NICHOLAS JARDINE, *Kepler = Koestler: on Empathy and Genre in the History of the Sciences*, «Journal for the History of Astronomy», 45, 2014, 3, pp. 271-286. A further hint of Koestler's identification with Kepler (which does not seem to have been noticed before) can be seen in the decision to open the biography of the German astronomer in *The Sleepwalkers* in the same way as he had begun the account of his own life in the autobiography *Arrow in the Blue* (1952): both volumes begin with an analysis of horoscopes.

8 «He [Kepler] had that mysterious knack of finding original outlets for inner pressure; of transforming his torments into creative achievement»; *SW*, p. 239.

9 Koestler's term «bisociation» referred to the fusion of two patterns of thought that were usually kept separate; cf. ARTHUR KOESTLER, *Insight and Outlook. An Inquiry into the Common Foundations of Science, Art and Social Ethics*, New York, MacMillan, 1949, pp. 36-38. In this sense: «Bisociation means combining two hitherto unrelated cognitive matrices in such a way that a new level is added to the hierarchy, which contains the previously separate structures as its members»; ID., *The Ghost in the Machine*, London, Hutchinson, 1967, p. 183; cf. also ID., *The Act of Creation*, London, Hutchinson, 1964, pp. 35-36; *SW*, p. 529. For the genesis of this idea see the interview with Koestler published in STANLEY ROSNER – LAWRENCE E. ABT (eds.), *The Creative Experience*, New York, Grossman, 1970, pp. 131-153: 144-145.

10 *SW*, p. 341.

11 *SW*, p. 10.

> This coexistence of the mystical and the empirical, of wild flights of thought and dogged, painstaking research, remained [...] the main characteristic of Kepler from his early youth to his old age. [...] It accounts for the incredible mixture in his work of recklessness and pedantic caution, his irritability and patience, his naïvety and philosophical depth. [...] Thus a purely mystical inspiration was the root out of which the first rational theory of the dynamics of the universe developed, based on the secular trinity of Kepler's laws.[12]

In general, Koestler saw in the unity of these two dimensions (the religious and the empirical) the indispensable requirement for the creation of a science rich in results and, at the same time, open to the most authentic human needs. In his opinion, the sources of inspiration of the two enterprises (science and religion) and of their agents were identical: in their attempt to answer the irrepressible human desire to attribute a meaning and a rational order to the cosmos, scientists and mystics shared the same aspiration to «catch glimpses of eternity through the window of time».[13]

Koestler did not view Copernicus and Galileo in the same favourable light as Kepler. Copernicus was characterised as «the Timid Canon» who was so lacking in intellectual courage that he could be considered «the most colourless figure among those who, by merit or circumstances, shaped mankind's destiny».[14] But it was particularly to Galileo that he attributed a historically negative role for having decisively contributed to dissolving the harmonious coexistence between the sense of the transcendental and scientific empiricism.

The Galilean «scandal» thus consisted of having broken the symbiotic unity between science and religion, which from then on were contraposed in an antithesis that entailed the fragmentation of the organic integrity of experience,[15] resulting in the weakening or even destruction of the spiritual inspiration that could confer metaphysical meaning and eth-

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12 *SW*, pp. 264-265.

13 *SW*, p. 531.

14 *SW*, p. 126. As pointed out by Michel-Pierre Lerner, Koestler's judgement on the temperament of Copernicus «entraîne une dévalorisation *a priori* de l'apport doctrinal»; Michel-Pierre Lerner, *Le "Copernic" de Koestler dans les "Somnambules" ou de l'art de (mal)traiter les sources*, «Giornale critico della filosofia italiana», s. 7, 91 (93), 2012, 2, pp. 514-529: 527. For a polemical emphasis on the many errors in Koestler's account, see Edward Rosen, *In Defence of Copernicus*, «The Polish Review», 18, 1973, 3, pp. 11-18.

15 «After Kepler, fragmentation of experience sets in again, science is divorced from religion, religion from art, substance from form, matter from mind»; *SW*, p. 394.

ical value on every aspect of life and of human achievements, including science.[16]

Koestler placed the principal responsibility for the event that gave rise to this unfortunate situation – the trial of 1633 – firmly on the shoulders of Galileo himself. His fault lay primarily in the inability to contain his own aggressiveness. The arrogance, presumption, scorn and obstinacy that he displayed in the face of his interlocutors led him to conduct an «ill-conceived crusade» in defence of Copernicus.[17]

Far from being a victim of religious intolerance, Galileo was destroyed by his own impudent presumption, by the superiority complex that made him feel «capable of outwitting all and making a fool of the Pope himself»,[18] and by his own blind obstinacy. In particular, Koestler insisted on the fact that, after having provoked the crisis with his *Copernican Letters*, «a kind of theological atom bomb, whose radioactive fall-out is still being felt»,[19] Galileo turned his back on any compromise. Although he did not have any decisive proof in favour of the Copernican system, he decided to take it as demonstrated and to oblige his opponents to disprove it.[20] He went on to regard his (fallacious) theory of the tides as «the secret weapon» to meet the challenge and, in a very different situation from the one that had led to the anti-Copernican edict of 1616, determined to publish the *Dialogue on the Two Chief World Systems*. It was the beginning of the end: a series of unfortunate accidents, favoured (if not provoked) by Galileo's «contemptuous arrogance», led to the condemnation in 1633, a crucial and disastrous episode that «discredited the heliocentric system and precipitated the divorce of science from faith».[21]

Koestler's polemical account of the Galileo affair is studded with inaccuracies,[22] but nevertheless reveals interesting points that make it, as Mau-

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16 Cf. *SW*, pp. 357, 534-539.

17 Koestler's picture of Galileo's personality is decidedly negative: «vanity, jealousy and self-righteousness combined into a demoniac force, which drove him to the brink of self-destruction»; *SW*, p. 368. Galileo «had a rare gift of provoking enmity» (p. 373), and viewed others with a «quasi-pathological contempt» (p. 493).

18 *SW*, p. 496.

19 *SW*, p. 440.

20 *SW*, p. 443.

21 *SW*, p. 503.

22 To mention only a few examples, Koestler attributes to Galileo the thesis that the comets are «atmospheric illusions»; *SW*, pp. 25, 113. He makes Kepler a member of the Accademia dei Lincei (p. 354); he calls the monastery of Vallombrosa a «Jesuit school» (p. 359); he defines Cardinal Dal Monte as the «brother-in-law» of Guidobaldo (p. 360); he gives the date of August

rice Finocchiaro observed, «the most serious indictment of Galileo since the original trial».[23] It is therefore hardly surprising that many of the reviewers of *The Sleepwalkers* discussed it extensively, and most of them were highly critical of its partiality. Stuart Hampshire criticised «the bias in the commentary and the tendency in the arrangement of the story»;[24] Edward Whitehead commented that «the treatment of Galileo is every bit as bad as that of Kepler was good»;[25] Milton Munitz found that «the treatment given Copernicus and Galileo shows much hostility and bias».[26] This «absurd bias against Galileo», according to Bernard Cohen, «makes a travesty of the concluding portion of Koestler's book» and minimises the significance of Galileo's contribution to science;[27] and Rupert Hall noted that «Mr. Koestler is a violent partisan in the way he treats ideas and characters», as demonstrated by «that lack of feeling for Galileo which is so marked and astonishing a feature of this book».[28]

8, 1609 (instead of 24) as the day on which Galileo presented the telescope to the Venetian Senate (p. 369); he puts the deaths of «professors Palmerini and Di Grazzia [*sic*]» around 1614 (p. 435), whereas in fact the first died in 1625 and the second certainly after 1629; he regards Francesco Sizzi as a monk (p. 435) and proclaims Bellarmine «general of the Jesuit order» (p. 449); he situates the placing on the Index of the Bellarmine *Disputationes* in 1890 (p. 450); he antedates the famous letter from Bellarmine to Foscarini of April 12, 1615 by eight days (p. 453); he elevates Piero Dini to the rank of Cardinal (pp. 451, 459, 479); he takes objection to the validity of the decree of March 5, 1616 in so far as it was not confirmed «by papal declaration *ex cathedra* or by Oecumenical Council» (pp. 463, 501), totally failing to grasp the jurisdictional prerogatives of the Congregation of the Index and forgetting, among other things, that the publication of the decree had been formally approved by Paul V in the meeting of the Holy Office on March 3, 1616; he takes Cardinal Maculano – whom he calls «Father Firenzuola», his place of birth – to be a Jesuit (p. 477) and the Genoese Niccolò Riccardi a «Florentine» (pp. 488, 489); he is mistaken about the name of the Florentine reviser of the *Dialogue* who was hostile to Galileo – it was not Clemente Egidi (who signed the *imprimatur* as Inquisitor of Florence), but Ignazio Del Nente (p. 489); he turns Francesco Barberini, the Cardinal Nephew of the Barberini Pope Urban VIII, into «Urban's brother» (p. 493); and the sister of Poor Clare Maria Celeste (Galileo's daughter) becomes a «Carmelite nun» (p. 500).

[23] Maurice Finocchiaro, *Retrying Galileo. 1632-1992*, Berkeley, University of California Press, p. 308.

[24] Stuart Hampshire, *Science and the Higher Truth*, «The New Statesman and Nation», January 31, 1959, pp. 159-160; now in Murray A. Sperber (ed.), *Arthur Koestler. A Collection of Critical Essays*, Englewood Cliffs, Prentice-Hall, 1977, pp. 137-141: 140.

[25] Edward Whitehead, *Counter-Revolutions of the Spheres*, «New Left Review», March 1, 1960, pp. 59-61: 59.

[26] Milton K. Munitz, Review of *The Sleepwalkers*, «Science», 130, 3371, August 1959, pp. 326-328: 326.

[27] I. Bernard Cohen, *Koestler on Kepler and the History of Man's Picture of the Universe*, «Scientific American», 200, 6, June 1959, pp. 187-192: 190.

[28] Rupert Hall, *The Psychopathology of Science*, «Nature», 4673, May 1959, pp. 1419-1420: 1420. On the reactions provoked by *The Sleepwalkers* see Sylvie Taussig, *La réception des* Somnambules *d'Arthur Koestler*, «Archives Internationales d'Histoire des Sciences», 67, 2017, pp. 19-49.

The strongest attack on Koestler came from Giorgio de Santillana and Stillman Drake in a highly critical intervention in «Isis». The two historians called into question many points in Koestler's reconstruction, finding there – in their own words – «impostures», «errors and misrepresentations», «serious and deliberate misstatements», «insolent misrepresentations, and deliberate distortions». In short, «the treatment [...] meted out to Galileo is simply dishonest from beginning to end».[29]

The objections of Santillana and Drake were to specific aspects of Koestler's reconstruction, such as Galileo's theory of the tides, the use of the sunspots as proof of terrestrial motion, Galileo as reader of Copernicus' *De revolutionibus*, but they did not go into the general tenor of Koestler's argument. Above all, they did not take into account the idea of science that lay behind his anti-Galilean stance.

As we shall presently see, Koestler attributed to modern science the same haughty *hubris* that had been a distinctive trait of Galileo's character («genius plus arrogance minus humility»).[30] It is, however, striking that the criticisms of the Galilean conceptions were insistently motivated on the basis of the discoveries of that same science that the Hungarian writer considered constitutionally vitiated by a fatal flaw: the loss of the spiritual dimension that had at one time been guaranteed by its intrinsic intertwining with religious thought. In rebuking Galileo for the falseness of the mechanical explanation of the tides or the interpretation of cometary phenomena, without taking into due account the state of the art at the time, Koestler not only fell into anachronism – a 'mortal sin' for a historian[31] – but he also formulated his own judgements within the framework of a notion of science whose weakness he constantly stressed.

Neither could it be argued that the author of *Darkness at Noon* accepted the epistemic value of science while proceeding to denounce its metaphysical and ethical limitations. To draw a distinction of that kind would be to

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[29] Giorgio de Santillana – Stillman Drake, *Arthur Koestler and his Sleepwalkers*, «Isis», 50, 1959, 3, pp. 255-260: 257-259. Koestler's reply was equally acrimonious, reaffirming his own theses and condemning the criticisms of the two scholars as a censorious incursion by «self-appointed Vigilantes»; Arthur Koestler, *Sleepwalkers and Vigilantes*, «Isis», 51, 1960, 1, pp. 73-77. The rejoinder of De Santillana and Drake, who unhesitatingly reasserted their positions, was printed there on pp. 77-79. For an energetic defence of Koestler's interpretation of the Galileo affair, see Mark Grabaud, *The Sleepwalkers: Its Contribution and Impact*, in Harris (ed.), *Astride the Two Cultures* (cit. note 3), pp. 20-36: 31-35.

[30] *SW*, p. 373.

[31] «[...] le péché des péchés, le péché entre tous irrémissible: l'*anachronisme*»; Lucien Febvre, *Le problème de l'incroyance au XVIe siècle. La religion de Rabelais*, Paris, Albin Michel, 1942 (repr. 1968), p. 15.

emphasise and justify at a meta-discursive level that very divorce between diverse dimensions of human experience that he so roundly condemned.

In fact, «the fatal estrangement» (between science and religion) had serious and profound epistemological repercussions for Koestler. Once the «indistinguishable unity of the mystic and the savant»[32] had been lost, the scientific enterprise tended to cancel the variegated and pluriform nature of phenomena as it concentrated exclusively on those aspects of the natural reality that could be dealt with quantitatively:

> Modern physics is not really concerned with "things" but with the mathematical relations between certain abstractions which are the residue of the vanished things.[33]

Hence: «Each advance in physical theory, with its rich technological harvest, was bought by a loss of intelligibility».[34] The emergence of mathematico-experimental science thus meant a loss of epistemic capacity, marked by the ignoring of the complexity of the real world and the concomitant hypostatisation of mathematical symbolic expressions.[35] As a result:

> The dials on our laboratory panels are turning into another version of the shadows in the cave. Our hypnotic enslavement to the numerical aspects of reality has dulled our perception of non-quantitative moral values; the resultant end-justifies-the-means ethics may be a major factor in our undoing.[36]

In spite of the condemnation of the «progressive spiritual desiccation» found in post-Galilean science,[37] as we have seen, Koestler's reconstruction of the changes in conceptions of the cosmos failed to problematise the most advanced scientific data, the touchstone to determine the greater or lesser validity of the theories of the past, seriously neglecting the cultural setting from which those theories emerged as well as the troublesome process of their validation.[38]

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32 *SW*, p. 10.

33 *SW*, p. 544.

34 *SW*, p. 540.

35 «Symbols have hardened into dogmas and the common source of inspiration is lost from view»; *SW*, p. 10.

36 *SW*, p. 552.

37 *SW*, p. 551.

38 In general: «Koestler not only does not adequately distinguish, but apparently fails to appreciate, the salient difference between the scientist's original moment of insight or discovery and the objective validation of his hypothesis, and between his (the scientist's) "moment of truth" and the achievement of public scientific knowledge»; Henry David Aiken, *The Metaphys-*

A blindness to context is in fact a striking characteristic of Koestler's historical method. It derives directly from the tendency to attribute theoretical choices to the character and psychology of the protagonists. What he considered relevant for the reconstruction of the development of science are the «obscure workings of the creative minds».[39] On his view, the study of the physical world takes the form of a hand-to-hand combat with the reality of nature conducted by isolated «sleepwalkers», driven by irrational impulses and neurotic obsessions. In this sense:

> The makers of the scientific revolution were individuals who in this transformation of the race played the part of the mutating genes. Such genes are *ipso facto* unbalanced and unstable. The personalities of these "mutants" already foreshadowed the discrepancy in the next development of man: the intellectual giants of the scientific revolution were moral dwarfs.[40]

These mutants cultivate different forms of obsession, but the ultimate cause of their creativity lies in the individual psychic torments that predispose and direct them to the suffering of change.[41]

In the case of Galileo, the *idée fixe* was his determination to demonstrate the motion of the Earth; however, unlike the «creative obsession» of Kepler, that «mystic chimera whose pursuit bore a rich and unexpected harvest», «Galileo's mania was of the sterile kind».[42] Koestler repeatedly stressed how Galileo never came up with an irrefutable proof of terrestrial motion: in spite of what he thought, it was certainly not the erroneous doctrine that attributed the tides to the Earth's motion.[43] Galileo's defence

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ics of Arthur Koestler, «The New York Review of Books», December 17, 1964, pp. 22-25; now in Sperber (ed.), *Arthur Koestler* (cit. note 24), pp. 151-161: 152.

39 *SW*, p. 11.

40 *SW*, p. 356. Koestler qualifies the expression «moral dwarfs»: «They were moral dwarfs only in proportion to their intellectual greatness».

41 In general: «The harnessing to a rational pursuit of the immense psychic energies derived from an irrational obsession seems to be another secret of genius, at least of genius of a certain type» (*SW*, p. 267). Even when he invokes some form of *Zeitgeist* or moral and intellectual climate of a determinate period, Koestler tends to assign it a psychoanalytic, if not psychiatric, physiognomy: «This [Galileo's conception of truth] may partly be explained by the *mores* of late Renaissance Italy ("that age without a superego" as a psychiatrist described it); [...]»; *SW*, p. 362.

42 *SW*, p. 471.

43 Koestler's criticisms of Galileo's explanation of the tides repeats (without acknowledgement) the thesis of Ernst Mach, who saw in it an obvious breach of the (Galilean) principle of the relativity of motion (cf. *SW*, pp. 471-473). In fact, both Mach and Koestler misinterpreted Galileo's argument, which, even in the (anachronistic) present state of knowledge, is not as strange as they thought. See Pierre Souffrin, *La théorie des marées de Galilée n'est pas une théorie fausse. Essai sur le thème de l'erreur dans l'histoire et l'historiographie des sciences*, «Epistémolo-

of Copernicanism was thereby shown to be largely the result of his own obstinate prejudices.

Koestler's attack presents various problematic aspects that arise from the need to affirm an idea of Galileo's work and of his rupture with the Church that was itself preconceived. Let us consider them briefly.

First, it is noteworthy that the objections to Galileo's adhesion to the heliocentric system are not extended to Kepler, who had always declared himself a follower of Copernicus, even though he was unable to adduce any 'proof' (in the Koestlerian sense) of the new cosmology. This was hardly different from the behaviour of the majority of astronomers who from the middle of the seventeenth century accepted heliocentrism long before an irrefutable validation of terrestrial motion in the form of the measurement of stellar parallax by Bessel in 1838 or the spectacular experiment conducted by Léon Foucault in 1851.

Upon closer inspection, the point that Koestler makes again and again regarding the lack of a «definite proof» of the heliocentric doctrine reveals a certain epistemological *naïveté* and is one more instance of the tendency to turn a blind eye to the context in which scientific debate was conducted at the time. The same demand for proof could (should) be addressed to the two other cosmologies in vogue at the time, that of Ptolemy and that of Tycho. It would be an embarrassing request, because not only did they obviously not have any «definite proof» (whatever that may mean), but geocentrism had been disqualified by Galileo's discovery of the phases of Venus. As for the solution put forward by Tycho, apart from the clumsy assumption of two centres – one of the world and one of planetary motion –, like the Ptolemaic model it discounted the difficulty that Giambattista Riccioli called «the Achilles' heel of the Copernican sect»,[44] namely the awareness that, in the absence of diurnal terrestrial motion, the vast sphere of the stars would have to accomplish a dizzying rotation around its own axis at an incredible velocity every day.[45] Moreover, though Koe-

giques», 1-2, 2000, pp. 113-139. Cf. also Michele Camerota, *Galileo Galilei e la cultura scientifica nell'età della Controriforma*, Roma, Salerno Editrice, 2004, pp. 362-363.

44 «Potissimum Copernicanae sectae argumentum, et, ut proverbio dicitur, Achilles»; Giovan Battista Riccioli, *Almagestum novum astronomiam veterem novamque complectens*, Bononiae, typ. Haeredis V. Benatii, 1651, II, col. 320a.

45 Koestler praised Tycho's system for the fact that it satisfied the demands of «metaphysical prudence and scientific caution» (rather strange criteria from an epistemological point of view) and considered it «the system of the universe which seemed to agree most closely with observed fact»; *SW*, pp. 466-467. This solid empirical corroboration was not

stler overlooked this point completely, Galileo cleared the ground of the physical objections to terrestrial motion formulated by Tycho himself by outlining an innovative conception that, in fusing cosmology with dynamics, fully justified the possibility of an Earth in motion.

The principal, if not only, motive for continuing to maintain the immobility and centrality of the Earth was rooted not in the field of science but in that of religious faith, given the need to maintain conformity with Holy Scripture at all costs. From this angle, the charge of prejudice levelled against Galileo should rather be levelled against his opponents, who subordinated the truth value of the scientific conclusions to agreement with the text of the Bible.

The fundamental weakness of Koestler's reconstruction can therefore be located in the substantial lack of an eye for the context in which theoretical constructs were debated. As we have seen, this historiographical attitude follows from the tendency to identify the engine of scientific progress in the individual psychology of brilliant minds, in their subjugation to overwhelming, irrepressible «creative obsessions».

Although inspired by evident dislike, Koestler's portrait of Galileo preserves a distinctive aspect of his intellectual personality and theoretical legacy: his 'modernity'. For Koestler, Galileo was «wholly and frighteningly modern» in his ability to keep scientific research and religious feeling in separate compartments. In line with Koestler's historiographical position, this peculiarity was due to a clearly defined temperamental constitution and could be explained in psychological terms:

> He [Galileo] was utterly devoid of any mystical, contemplative leanings, in which the bitter passions could from time to time be resolved; he was unable to transcend himself and find refuge, as Kepler did in his darkest hours, in the cosmic mystery. He did not stand astride the watershed; Galileo is wholly and frighteningly modern.[46]

So Koestler lucidly clung to an essential aspect, even though one that in his eyes held dangerous implications, of Galileo's contribution. He stressed this point in an address delivered in 1967, in which he linked Galileo's mo-

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held to be so for very long: as an expert notes: «The Tychonic system is mentioned in printed books consistently up to 1680, and there are scattered favourable references to it after that date; from 1700 onwards, however, it is normally mentioned in order to refute it»; Christine Jones Schofield, *Tychonic and Semi-Tychonic World Systems*, New York, Arno Press, 1981, p. 315.

46 *SW*, p. 368.

dernity with the Enlightenment: «Galileo was a modern, who belongs to the Century of Enlightenment, though he did not live to see it».[47]

In *The Act of Creation* from 1964 he was to qualify Galileo's recourse to mathematical quantification as an example of «monumental bisociation», a «fertile combination of experimenting and theorizing», but he went on to specify that:

unlike Kepler and the Pythagoreans, Galileo did not look at the 'dance of numbers' through the eyes of a mystic. He was interested neither in number-lore nor in mathematics for its own sake [...] Quantitative measurements and formulations were for Galileo simply the most effective tools for laying bare the inherent rationality of nature. The belief in this rationality (and in the rationality of nature's creation, the human mind) was Galileo's religion and spiritual salvation – though he did not realize that it was a religion, based on an act of faith.[48]

Whatever the motivation and nature of his epistemological convictions, it remains true that Galileo vigorously affirmed the need to liberate science from any form of subordination to religious thought and to decisively claim its autonomy. Though he viewed it in a negative light, Koestler thus perceptively understood Galileo's move to promote «the fatal estrangement», to draw a clear line of demarcation between the study of natural phenomena and theological reflection.

The Sleepwalkers heralded the start of a new phase in Koestler's literary production, inaugurating a series of works that were all intended to expound a highly personal vision of science. It was developed with reference to such grand themes as the mind-body relation, biological evolution, and the neural bases of human behaviour. These works have often been viewed in a very critical light, and the same is true of the remarkable conclusions at which he arrived. To take just a few examples, Koestler favoured a sort of «modified "Mini-Lamarckism" as an explanation for some limited and rare evolutionary phenomena»;[49] he maintained the reality of parapsychological phenomena, finding them «somewhat less preposterous in the light of the unthinkable propositions of physics»;[50] he located an articulated hi-

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47 Arthur Koestler, *Gravity and the Holy Ghost*, in Id., *Drinkers of Infinity* (cit. note 1), pp. 1-13: 12.

48 Koestler, *The Act of Creation* (cit. note 9), p. 680.

49 Arthur Koestler, *The Case of the Midwife Toad*, New York, Random House, 1971, p. 130.

50 Arthur Koestler, *The Roots of Coincidence*, London, Hutchinson, 1972 (repr. London, Picador, 1979), p. 11. Koestler, who killed himself in 1983, left a considerable sum to the Uni-

erarchy of *holons* as the constituent parts of every complex system;[51] he argued that the functional discordance between the area of the brain with a more recent phylogenetic development (neocortex) and the oldest and deepest part (limbic system) condemns humankind to a constitutive «paranoid streak», and proposed the use of a drug to bring about harmony between emotional reactions and rational processes.[52]

These original and at times provocative theses, which were apt to elicit harsh reactions,[53] revealed the author's scientific passion. Of course, Koestler was not a scientist by profession, but he had a thorough grounding in physics and biology, which allowed him to discuss with some of the most authoritative individuals at the time. The symposium that he organised in Alpbach in 1968 included the likes of Ludwig von Bertalanffy, Jerome Bruner, Viktor Frankl, F.A. Hayek, Holger Hydén, Paul MacLean, Jean Piaget, J.R. Smythies, W.H. Thorpe and C.H. Waddington,[54] and his contacts with John von Neumann and Erwin Schrödinger should be mentioned too.[55]

Koestler's theoretical orientations, shaped in direct confrontation with reductionism, behaviourism and Neo-Darwinism, were fundamentally inspired by that dissatisfaction with scientific rationality that he had outlined in *The Sleepwalkers*. In fact, the mystical suggestions, the criticism of the

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versity of Edinburgh to set up a chair of parapsychology. Scammell, *Koestler* (cit. note 7), p. 567, gives the sum of £ 400,000, while Cesarani, *Arthur Koestler* (cit. note 7), p. 551, claims that «the total fell not far short of one million pound».

51 The holons stand for «those Janus-faced entities on the intermediate levels of any hierarchy, which can be described either as wholes or as parts, depending on the way you look at them from "below" or from "above"»; Arthur Koestler, *Janus. A Summing Up*, London, Hutchinson, 1978, p. 33. But cf. too Id., *The Ghost in the Machine* (cit. note 9), pp. 45-58, and Id., *Beyond Atomism and Holism – the Concept of Holon*, in Arthur Koestler – John Raymond Smythies, *Beyond Reductionism. New Perspectives in the Life Sciences*, London, Hutchinson, 1969, pp. 192-216.

52 Koestler even hypothesised the distribution of a «mental stabiliser» in the water supply: «Some Swiss canton might decide, after a public referendum, to add the new substance to the chlorine in the water supply, for a trial period, and other countries may follow their example»; Koestler, *The Ghost in the Machine* (cit. note 9), p. 337; Koestler, *Janus* (cit. note 51), p. 105.

53 As Tony Judt noted: «Those books [...] were panned by specialists for their idiosyncratic speculation, their searching for coherence and meaning in every little coincidence and detail, their abuse of analogy, and the overconfident intrusion of their author into matters of which he was comparatively ignorant»; Tony Judt, *Arthur Koestler, the Exemplary Intellectual*, «The New Republic», January 2000, now in Id., *Reappraisals. Reflections on the Forgotten Twentieth Century*, London, Vintage Books, 2009, pp. 25-42: 27.

54 Cf. Koestler – Smythies, *Beyond Reductionism* (cit. note 51). On Koestler's anti-reductionist programme see James F. Stark, *Anti-Reductionism at the Confluence of Philosophy and Science: Arthur Koestler and the Biological Periphery*, «Notes and Records», 70, 2016, pp. 269-286.

55 Cf. Scammell, *Koestler* (cit. note 7), pp. 390-391, 403, 473-474.

hubris of modern science, the threat posed by science to spiritual and ethical values, were all positions that emerged in the immediate aftermath of his painful break with communism. His political disillusionment focused Koestler's reflections on a series of antitheses in which he steadfastly opted for the second pole: matter / spirit, reason / intuition, community / individual, pragmatism / ethics. These options motivated his critique of the Galilean scientific model (and of the person Galileo himself) in *The Sleepwalkers*, but more generally they were the thread running through his entire epistemological work.

In his *The Trail of the Dinosaur* from 1955, Koestler had already warned of the risks entailed by the prodigious development of science in the last few centuries as a result of the moral decline and existential discomfort to which they had given rise. The immanentist sense of self-determination («destiny from below») that had replaced a belief in divine providence («destiny from above») could not serve as a metaphysical compass of human existence:

> The new determinants of man's fate – mechanical laws, atom, glands, genes – which gradually took over, were of a lower order than man himself; they defined his condition but could provide no guidance whatsoever for his conscience. [...] the old [religious] explanations [...] answered the question after 'the meaning of life' whereas the new [scientific] explanations, with all their precision, made the question of meaning itself meaningless.[56]

The same concepts are repeated in almost the same words in *The Sleepwalkers*,[57] but they had already been articulated in two essays from 1942 and 1944, *The Yogi and the Commissar* (*I* and *II*).[58] The two protagonists – the ascetic and the People's Commissar (like the protagonist of *Darkness at Noon*, Nikolai Salmanovich Rubashov) – are the incarnations of two opposed views of life, the former centred on contemplation, the latter on transformational action. The Yogi rejects any use of force and considers that «logical reasoning gradually loses its compass value as the mind approaches the magnetic pole of Truth or the Absolute, which alone matters».[59] The Commissar, on the other hand, views reality as a mechanism that can be under-

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56 Cfr. Koestler, *The Trail of the Dinosaur* (cit. note 5), pp. 153-154.

57 Cf. *SW*, p. 550.

58 Later collected in Arthur Koestler, *The Yogi and the Commissar*, London, Jonathan Cape, 1945 (1947³), pp. 9-18, 227-256. Hereafter *YC*.

59 *YC*, pp. 9-10.

stood with the instruments of rational thought and changed from without, not excluding the use of violence and deceit.[60] On the epistemological level, the Commissar's position agrees with the dominant mechanism of classical physics.[61] «Commissar-science» stands for a rigid determinism in which human beings are regarded as «physico-chemical automata», inexorably subordinated to the «iron grip» of heredity and environmental conditioning, within a theoretical framework characterised by the systematic adoption of mathematical procedures.[62] The quantitative approach also lies behind a particular ethical vision – «Commissar-ethics» – that takes calculus as the heuristic source (and conceptual core) of value. «Commissar-ethics» ignores the moral problem of the use of means to achieve an end whose desirability has been fixed by computation.[63] In pointing out the «moral disaster» caused by the fallacious tenet that 'the end justifies the means', Koestler stressed the incommensurability of human existence:

> Three hundred years ago Galileo already knew that the rules of computation cannot be applied to the symbols 0 and ∞; Commissar-ethics has still to learn that the individual stands in the social equation both for Zero and the Infinite.[64]

Beyond this extrinsic reference to Galileo's mathematical knowledge, the Pisan scientist lies for Koestler, as we have seen, behind the mechanistic paradigm which, with its *hubris* based on calculation and its rupture with the unity of «mystic and savant», produces the «spiritual starvation» of our time.[65] As Koestler put it:

> the divorce of moral from intellectual values is [...] a characteristic development of the last few centuries. It is foreshadowed in the philosophy of Galileo, and became fully explicit in the ethical neutrality of modern determinism.[66]

That ethical neutrality stems from the application of quantitative measurement to axiological framework:

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[60] In general, the Commissar's codes of behaviour «emphasize activity instead of passivity, domination instead of submission, ruthlessness instead of meekness, calculation instead of guidance»; *YC*, p. 234.

[61] Cf. *YC*, p. 17.

[62] *YC*, p. 232.

[63] «A system of ethics based on quantitative criteria is a slope on which there is no halt because all is a matter of degree and not of (qualitative) values»; *YC*, p. 252.

[64] *YC*, p. 253.

[65] Cf. *SW*, pp. 534-539, 548-551.

[66] *SW*, p. 357.

we have been so thoroughly trained to think in quantitative terms that the application of mathematical criteria to ethical method appears to us simply as an act of common sense.[67]

Thus, for Koestler, this process is closely connected with the epistemic privileging of the 'primary qualities':

> Galileo takes the hyperstatization of mathematics a decisive step further by reducing all nature to "size, figure, number and slow or rapid motion", and by relegating into the limbo of "subjective" or "secondary" qualities everything that cannot be reduced to these elements – *including, by implication, ethical values and the phenomena of the mind*.[68]

Perhaps this is why Galileo is presented in such a negative light in *The Sleepwalkers*. Besides other aspects connected with the scorn for others, arrogance and vanity, Koestler's Galileo seems inclined to the unscrupulousness typical of the professional revolutionary, for whom «the end justifies the use of all means».[69] Thus Galileo is characterised as «downright dishonest», being prone to «a distortion of the facts» for the sake of «misleading propaganda».[70] Regarding Galilean tidal theory, Koestler even goes so far as to claim that «impostures like Galileo's are rare in the annals of science».[71] For both his Galileo and his Commissar, the pursuit of the end – the affirmation of the Copernican or communist revolution – justifies every kind of behaviour, including lies and deceit.

So it is in the conceptual continuity with the other works of the period that the key lies to Koestler's interpretation of the life and works of Galileo. Certainly the idea of an antithesis between the mathematical desiccation of reality performed by modern science and the variegated, pluriform 'world of life' was widespread in European culture of the first decades of the twentieth century, albeit in profoundly and substantially different variations. Notwithstanding, the themes underlying the historical reconstruction conducted in *The Sleepwalkers* are more closely and directly related to the preoccupations that were given a narrative form in *Darkness at Noon*. And it is by no means fortuitous that, when Koestler tackles the destiny of post-Galilean science at the end of his history of cosmology, he has re-

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67 *YC*, p. 252.

68 *SW*, p. 535 (emphasis added).

69 *YC*, p. 9.

70 *SW*, pp. 483-484.

71 *SW*, p. 486.

course to the same image with which he had concluded the novel to draw the moral: the adventurous course of revolutionary politics, free of any ethical ballast, had ended in miserable failure:

What had he [Rubashov] once written in his diary? "We have thrown overboard all conventions, our sole guiding principle is that of consequent logic; we are sailing without ethical ballast."
Perhaps the heart of the evil lay there.
Perhaps it did not suit mankind to sail without ballast. And perhaps reason alone was a defective compass, which led one on such a winding, twisted course that the goal finally disappeared in the mist.
Perhaps now would come the time of great darkness.[72]

Freed from mystical ballast, science could sail ahead at breathtaking speed to its conquest of new lands beyond every dream. Within two centuries it transformed the mental outlook of homo sapiens and transformed the face of his planet. But the price paid was proportionate: it carried the species to the brink of physical self-destruction, and into an equally unprecedented spiritual impasse. Sailing without ballast, reality gradually dissolved between the physicist's hands; matter itself evaporated from the materialist's universe.[73]

For Koestler, ethical ballast and religious burdens are the necessary counterweight to the conceptualising arrogance of scientific thought and of politics as a science. Their origin goes back to the mystical experience that reveals the absurdity of the world and is a testimony of a deeper, ultimate dimension: the «invisible writing», the transparent metaphysical alphabet that unveils the spiritual meaning of existence:

if the conceptual world was mistaken for ultimate reality, the world became an equally absurd tale, told by an idiot or by idiot-electrons which caused little children to be run over by motor cars, and little Andalusian peasants to be shot through heart, mouth and eyes, without rhyme or reason. Just as one could not feel the pull of a magnet with one's skin, so one could not hope to grasp in cognate terms the nature of ultimate reality. It was a text written in invisible ink; and though one could not read it, the knowledge that it existed was sufficient

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[72] Arthur Koestler, *Darkness at Noon*, London, Cape, 1940 (New York, Scribner, 2005), p. 265. The work, written in German, was published in the English translation done by Daphne Hardy, Koestler's 21-year-old girlfriend. The original German manuscript has never been found, but a carbon copy was discovered in 2015 in the archive of Emil Oprecht, founder of the Europa publishing house in Zurich. A new English translation based on that copy has been published: Arthur Koestler, *Darkness at Noon*, transl. by Philip Bohme, ed. by Michael Scammell, New York, Scribner, 2019. The passage on p. 231 of the new edition is substantially the same as the text first published in 1940.

[73] *SW*, p. 539.

to alter the texture of one's existence, and make one's actions conform to the text.[74]

Moral principles, like scientific discoveries, are thus the product of the intuitions of single 'sleepwalkers', the non-rational product of individual illuminations. In both cases, the discoveries are thus derived from ineffable personal experiences, akin to that extremely private «oceanic feeling» so dear to Koestler.[75] The role of social process, the contribution of discussion within a community, the development of associated research – all this is completely ignored. Hence the aspect of most interest to the historian, the context, ends up by disappearing from sight.

Indeed, the theoretical root of Koestler's position lies in the radically individualistic choice that followed the tormented reflection on the 'God that failed'. In the end, his epistemological position was strongly influenced by his political scepticism, being connected with a critical reconsideration of the limits of collective action and intelligence (and perhaps of the very idea of community). To all this Koestler contraposes the absolute value of the individual:

> I don't believe that the end justifies the means. I don't believe that an individual is the result of a crowd of a million divided by a million.[76] I don't believe any more in the humanity. I believe in the individual.[77]

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[74] Arthur Koestler, *The Invisible Writing*, London, Collins, 1954 (London, Vintage, 2019), p. 432.

[75] The reference to «oceanic feeling» – the proto-religious feeling of communion with the universe, which Romain Rolland discussed with Sigmund Freud in 1927, who went on to discuss it in his *Civilisation and Its Discontents* (1929) – recurs in the works of Koestler. According to him, the «oceanic feeling» played a crucial role in the development of scientific thought: «From the Pythagoreans onward, through the Renaissance to our times, the oceanic feeling, the sense of participation in the mystery of the infinite, was the principal inspiration of that winged and flatfooted creature, the scientist»; Koestler, *The Act of Creation* (cit. note 9), p. 263.

[76] Cfr. Koestler, *Darkness at Noon* (trad. Hardy, cit. note 72), p. 262: «The Party did not recognize its [i.e. the individual's] existence. The definition of the individual was: a multitude of one million divided by one million».

[77] Interview in «Paris Presse-L'Intransigeant»; cf. Scammell, *Koestler* (cit. note 7), p. 447.

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What impact and influence did Galileo's writings have on modern Europe? Which scientific, philosophical, literary and political milieus did they reach? Who were his readers and how did they read his works? What kind of interpretations and contaminations did his work give rise? To what extent did the inquisitorial vicissitudes affect the circulation of his ideas across the Catholic and Protestant world? To what extent did the affair related to his condemnation contribute to the rise of the myth of Galileo? Some answers to these questions will be found in this book, that brings together the proceedings of the International Conference held in Florence between 29-31 January 2020, and based on the collaboration between historians of science, politics and society in modern and contemporary age, historians of philosophy, art, publishing, literature and theatre.

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